

INFORMATION DISCLOSURE STATEMENT

The listing of certain references in the specifications is objected to as not being part of a proper information disclosure statement.

CLAIM REJECTION UNDER 35 U.S.C. 112

Claims 1-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite.

CLAIM REJECTION UNDER 35 U.S.C 103

Claims 1-24 are rejected under 35 U.S.C. 103(a) as being obvious based on a patent to Handley et al., in view of a publication by Moriya et al.

REMARKS RELATED TO THE SPECIFICATIONS

Enclosed for ease in the examiner's review and for his file is a complete rewritten copy of the specifications, claims and abstract properly formatted as required under 37 CFR 1.52(b) and 1.75(h). The abstract has been shortened to comply with having less than 150 words. No new matter has been added to the substitute application.

The new specifications are offered to remove the various informalities raised by the examiner on pages 2 and 3 of his office action. The undersigned acknowledges with appreciation the examiner's thoroughness in reviewing the specifications and objecting to the various informalities, which have now been corrected.

REMARKS RELATED TO AN INFORMATION DISCLOSURE AGREEMENT

In the new specifications submitted herewith, the improper references to a Soviet Union Author's Certificate 949574 and a Russian Patent Number 2,045,079 have been removed. The applicants have been unable to obtain copies of these references with English translations. The applicants have advised the undersigned that while the documents disclose prior art methods of vibroseis seismic prospecting in Russia, the references do not disclose or claim the subject invention for detecting microseismic noise from the earth. The documents do disclose traditional methods of oil and gas exploration using the seismic vibrations reflected off subsurface geological formations.

REMARKS RELATED TO CLAIM REJECTION UNDER 35 U.S.C. 112

The examiner has rejected claims 1-24 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to include in the specifications, page 7, line 9, support for the sentence which states "Obtained data is mathematically processed.". The examiner further states that the specifications fail to include steps, formulations or equations for mathematically processing the data. The applicants do not agree!

The subject method invention has nothing to do with the way data is mathematically processed. A skilled geophysical engineer can process the raw data received from a receiver of information signals using any number of different ways using a computer or other means for calculating signals and practice the subject invention, which measures microseismic noise received from the earth in a selected area of interest.

Based on the above remarks, it is respectfully requested that the rejection under 35 U.S.C. 112, second paragraph now be removed.

REMARKS RELATED TO CLAIM REJECTION UNDER 35 U.S.C. 103

Claims 1-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over a patent to Handley et al. in view of a publication to Moriya et al.

The Handley et al. patent discloses a method and apparatus for obtaining seismic vibrator reflection data with an improved signal to noise ratio. The apparatus described in this patent is a vibrator, which is capable of providing a typical sweep signal in the industry of 20 Hz to 120 Hz over a time period of 12 to 40 seconds as describe in column 7, lines 37-44. Handley et al. does not disclose or teach a method of registering and measuring microseismic noise from the earth within a 2 to 5 Hz range for hydrocarbon deposit detection.

The publication authored by Moriya et al. discloses a technique for signal processing three-component microseismic data. The technique provides for precise determination of P-wave arrival times. Moriya et al. does not disclose the detection of hydrocarbons by registering and measuring microseismic noise from the earth within a 2 to 5 Hz frequency range as a passive information signal. The passive information signal compared with an information signal from an area known not to contain hydrocarbons.

On page 5 of the examiner's office action, the examiner rejects independent claims 1, 4, 9, 12, 17 and 21 wherein he states that Handley et al. discloses at least one receiver of seismic vibrations capable of recording at least one component within a 2 to 5 Hz frequency range over an expected hydrocarbon deposit. This is not true! Handley et al. disclose a traditional method of seismic exploration using a vibrator for obtaining reflected data off of subsurface formations as clearly shown in FIG. 1 of the patent. As mentioned above, the vibrator used in Handley et al. provides a typical sweep signal of 20 to 120 Hz over a time period of 12 to 40 seconds.

Independent claim 1 describes a method for detection of hydrocarbon deposits onshore using a receiver for registering and measuring the spectral characteristics of microseismic noise from the earth within a 2 to 5 Hz range for creating a passive information signal. The passive information signal is compared with an information signal from an area known not to contain hydrocarbons. The prior art clearly does not disclose the method steps found in claim 1. Claim 1 should be allowed.

Claims 2 and 3 are dependent on the patentable subject matter of claim 1. These claims should be allowed.

Independent claim 4 is similar to claim 1 and discloses an additional step of generating an active information signal using seismic vibrations. The active information signal is compared with the passive information signal within the 2 to 5 Hz range. The prior art does not disclose the method steps found in claim 4. Claim 4 should be allowed.

Claims 5-8 are dependent on the patentable subject matter of claim 4. These claims should be allowed.

Independent claim 9 describes a method for detection of hydrocarbon deposits offshore using a receiver for registering and measuring the spectral characteristics of microseismic noise from the earth within a 2 to 5 Hz range for creating a passive information signal. This claim is similar to claim 1. The passive information signal is compared with an information signal from an area known not to contain hydrocarbons. The prior art clearly does not disclose the method steps found in claim 9. Claim 9 should be allowed.

Claims 10 and 11 are dependent on the patentable subject matter of claim 9. These claims should be allowed.

Independent claim 12 is similar to claim 4 and discloses an additional step of generating an active information signal using seismic vibrations offshore. The active information signal is compared with the passive information signal within the 2 to 5 Hz range. The prior art does not disclose the method steps found in claim 12 for offshore detection of hydrocarbons. Claim 12 should be allowed.

Claims 13-16 are dependent on the patentable subject matter of claim 12. These claims should be allowed.

Independent claim 17 describes a method for monitoring a producing oil and gas field by using a receiver for registering and measuring the spectral characteristics of microseismic noise from the earth within a 2 to 5 Hz range for creating an information signal. The information signal is compared with an information signal from an area known not to contain hydrocarbons. The prior art does not disclose the method steps found in claim 17 for monitoring a producing oil and gas field by recording the spectral characteristics of microseismic noise in the 2 to 5 Hz range. Claim 17 should be allowed.

Claims 18-20 are dependent on the patentable subject matter of claim 9. These claims should be allowed.

Independent claim 21 describes a method for monitoring fill levels of subsurface gas storage using receivers at surface control stations for registering and measuring the spectral characteristics of microseismic noise from the earth within a 2 to 5 Hz range at each control station. The prior art does not disclose the method steps found in claim 21 for monitoring underground gas below control stations. Claim 21 should be allowed.

Claims 22-24 are dependent on the patentable subject matter of claim 9. These claims should be allowed.

CONCLUSION

Re-examination, reconsideration and allowance of the application are requested in view of the foregoing remarks.

Should the examiner have any questions regarding this amendment it is urged that he/she contact the undersigned.

Respectfully submitted,

Edwin H. Crabtree

Edwin H. Crabtree, Patent Attorney
Registration Number 26,720
3773 Cherry Creek N. Dr. Suite 575
Denver, Colorado 80209
303 322 7460

CERTIFICATE UNDER 37 C.F.R. 1.8(a)

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington,

D.C. 20231, on November 29, 2001

Date: 11/29/01 Edwin H. Crabtree

Applicant's Attorney